Space Weather Forecast

Issued on Tuesday, 04 October 2022 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor storms possible, mainly Day 1. Ongoing likelihood of Moderate flares with slight chance of isolated Strong flares due to two notable sunspot groups.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the past 24 hours, with multiple moderate class flares from two notable spot, one in the northwest and one from the northeast. There are currently seven numbered sunspot regions on the visible disc. The spots in the northwest have intertwining magnetic fields and appear relatively unstable. The spot in the northeast remains a large and longitudinally wide area, with a complex magnetic field. The remaining spots show little evidence of flares.

A filament eruption in the southeast late on the 2nd produced a coronal mass ejection, this has a very slight chance of glancing Earth early day 3 (6th). However, this is low confidence, and any significant impacts are considered unlikely.

Solar Wind / Geomagnetic Activity: Solar wind parameters have indicated the possible arrival of two glancing coronal mass ejections embedded within a coronal hole high speed stream. Solar wind speeds have become elevated, on a rising trend. The total interplanetary magnetic field was mostly weak to moderate, but briefly strong between 03/1830-1930 UTC. The north-south component flucuated between moderately positive and negative. The resultant geomagnetic activity was mainly Quiet to Active (Kp 2-4), but with two G1/Minor Storm (Kp 5) intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has trended back to background levels, with no solar proton storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Moderate, with a chance of High levels, due to likely further flares from the large region in the northeast and the region in the northwest.

Solar Wind / Geomagnetic Activity: There is a chance of further coronal mass ejection glancing blows to occur on day 1 (4th). Solar winds are elevated due to a combination of coronal hole high speed streams and coronal mass ejection arrivals, these are expected to follow a decreasing trend in coming days, bar a slight chance of a coronal mass ejection glancing blow early on 6th. Geomagnetic activity is forecast to be mainly Unsettled to Active (Kp 3-4) day 1 (4th) with a chance of further G1/Minor storms (Kp 5) due to any further coronal mass ejection influences. Otherwise, a general trend back toward Quiet to Unsettled (Kp 0-3) is likely through the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to be near or at background but with a chance of rising at times due to any further flaring from the notable sunspots. This giving a slight chance of exceeding the S1/Minor Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	40	15	20	5
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	60
Very Active	R3 to R5 X	No	20	20	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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